

# A2 CCI Review key Q2T2

$$1) \frac{h-20}{h^2-16} + \frac{2}{h-4} = \frac{h-20}{(h+4)(h-4)} + \frac{2}{h-4} \quad \text{LCD: } (h+4)(h-4)$$

$$\frac{h-20}{(h+4)(h-4)} + \frac{2(h+4)}{(h+4)(h-4)} = \frac{h-20+2h+8}{(h+4)(h-4)} = \frac{3h-12}{(h+4)(h-4)} = \frac{3(h-4)}{(h+4)(h-4)}$$

$$= \boxed{\frac{3}{h+4}}$$

$$2) \frac{2}{x-3} + \frac{4}{3-x} = \frac{2}{x-3} + \frac{-4}{x-3} = \boxed{\frac{-2}{x-3}}$$

$$3) \frac{3}{x^2-16} + \frac{2}{x^2-4x}$$

$$\text{LCD: } x(x-4)(x+4)$$

$$\frac{3}{(x-4)(x+4)} + \frac{2}{x(x-4)} = \frac{3x}{x(x-4)(x+4)} + \frac{2(x+4)}{x(x-4)(x+4)} = \frac{3x+2x+8}{x(x-4)(x+4)} = \boxed{\frac{5x+8}{x(x-4)(x+4)}}$$

$$4) \frac{4}{x^2+4x-5} - \frac{3}{x^2-1}$$

$$\text{LCD: } (x+5)(x+1)(x-1)$$

$$\frac{4}{(x+5)(x-1)} - \frac{3}{(x+1)(x-1)} = \frac{4(x+1)}{(x+5)(x-1)(x+1)} - \frac{3(x+5)}{(x+5)(x+1)(x-1)}$$

$$\frac{4x+4-3x-15}{(x+5)(x+1)(x-1)} = \boxed{\frac{x-11}{(x+5)(x+1)(x-1)}}$$

$$\text{LCD: } a^2 b^2$$

$$5) \frac{a-2b}{a^2 b} - \frac{a+b}{ab^2}$$

$$\frac{b(a-2b)}{a^2 b^2} - \frac{a(a+b)}{a^2 b^2} = \frac{ab-2b^2-a^2-ab}{a^2 b^2} = \boxed{\frac{-2b^2-a^2}{a^2 b^2}}$$

$$6) \left( \frac{1}{a} - \frac{1}{b} \right) \frac{\text{LCD: } ab}{ab} = \frac{b-a}{ab}$$

$$\left( \frac{1}{b^2} - \frac{1}{a^2} \right) \frac{\text{LCD: } a^2 b^2}{a^2 b^2} = \frac{a^2 - b^2}{a^2 b^2} \Rightarrow \frac{b-a}{ab} \cdot \frac{a^2 b^2}{a^2 - b^2}$$

$$\frac{b-a}{ab} \cdot \frac{a^2 b^2}{(a+b)(a-b)} = \boxed{\frac{-ab}{a+b}}$$

$$7) \left( \frac{1}{1} - \frac{1}{x} \right) \frac{\text{LCD: } x}{x} = \frac{x-1}{x}$$

$$\left( \frac{x-2}{1} + \frac{1}{x} \right) \frac{\text{LCD: } x}{x} = \frac{x^2-2x+1}{x}$$

$$\frac{x-1}{x} \cdot \frac{x}{(x-1)(x-1)} = \boxed{\frac{1}{x-1}}$$

$$8) \frac{1}{2a} - \frac{9}{a^2+b^2} = \frac{2-a}{2a+12}$$

$$\frac{a+b}{2a(a+b)} - \frac{9(2)}{2a(a+b)} = \frac{(2-a)a}{2a(a+b)}$$

$$\text{LCD: } 2a(a+b)$$

$$a+b-18 = 2a-a^2$$

$$a-12 = 2a-a^2$$

$$\frac{a^2-2a}{a^2-2a} = \frac{-2a+a^2}{-2a+a^2}$$

$$a^2 - a - 12 = 0$$

$$(a-4)(a+3) = 0$$

$$\boxed{a=4 \quad a=-3}$$

$$\text{LCD: } 6$$

$$9) \frac{2x+3}{6} - \frac{2x+3}{3} = \frac{1}{2} \quad \rightarrow \begin{aligned} 2x+3 - 4x-6 &= 3 \\ -2x-3 &= 3 \\ -2x &= 6 \\ \frac{-2x}{-2} &= \frac{6}{-2} \end{aligned}$$

$$\frac{2x+3}{6} - \frac{2(2x+3)}{6} = \frac{3}{6}$$

$$\boxed{x = -3}$$

$$10) \frac{1}{x+3} - \frac{2}{3-x} = \frac{4}{x^2-9} \Rightarrow \frac{1}{x+3} - \frac{-2}{x-3} = \frac{4}{(x+3)(x-3)}$$

$$\text{LCD: } (x+3)(x-3)$$

$$\frac{x-3}{(x+3)(x-3)} - \frac{-2(x+3)}{(x+3)(x-3)} = \frac{4}{(x+3)(x-3)}$$

$$x-3 + 2x+6 = 4$$

$$3x+3 = 4$$

$$3x = 1$$

$$\boxed{x = \frac{1}{3}}$$

$$11) 2x^2 = 13x - 15$$

$$2x^2 - 13x + 15 = 0$$

$$a = 2$$

$$b = -13$$

$$c = 15$$

$$x = \frac{-(-13) \pm \sqrt{(-13)^2 - 4(2)(15)}}{2(2)} = \frac{13 \pm \sqrt{49}}{4}$$

$$= \frac{13 \pm 7}{4}$$

$$\frac{13+7}{4} = \frac{20}{4} = \boxed{5}$$

$$\frac{13-7}{4} = \frac{6}{4} = \boxed{\frac{3}{2}}$$



$$12) \quad x^2 - 6x = -21$$

$$x^2 - 6x + 21 = 0$$

$$a = 1$$

$$b = -6$$

$$c = 21$$

$$x = \frac{-(-6) \pm \sqrt{(-6)^2 - 4(1)(21)}}{2(1)}$$

$$x = \frac{6 \pm \sqrt{-48}}{2} = \frac{6 \pm i\sqrt{48}}{2} = \frac{6 \pm 4i\sqrt{3}}{2}$$

$$= \boxed{3 \pm 2i\sqrt{3}}$$

$$13) \quad \frac{2x^2}{2} + \frac{12x}{2} + \frac{6}{2} = 0$$

$$x^2 + 6x + 3 = 0$$

$$x^2 + 6x + \boxed{9} = -3 + \boxed{9}$$

$$\text{Half} = \frac{6}{2} = 3$$

$$\text{Square} = 3^2 = 9$$

$$(x+3)^2 = 6$$

$$x+3 = \pm \sqrt{6}$$

$$\boxed{x = -3 \pm \sqrt{6}}$$

$$14) \quad 2x^2 = 7x - 4$$

$$2x^2 - 7x + 4 = 0$$

$$a = 2$$

$$b = -7$$

$$c = 4$$

$$x = \frac{-(-7) \pm \sqrt{(-7)^2 - 4(2)(4)}}{2(2)}$$

$$\boxed{x = \frac{7 \pm \sqrt{17}}{4}}$$

$$b^2 - 4ac$$

No b so  $b=0$

$$15) (3)^2 - 4(2)(2) \\ 9 - 16 = -7 \quad \textcircled{B}$$

$$16) 0^2 - 4(3)(-12) \\ 144 \quad \textcircled{D} \\ \uparrow \text{perfect square}$$

$$17) 2y^2 + 3y + 2 = 0$$

$$a = 2$$

$$b = 3$$

$$c = 2$$

$$y = \frac{-3 \pm \sqrt{(3)^2 - 4(2)(2)}}{2(2)}$$

$$y = \frac{-3 \pm \sqrt{-7}}{4}$$

$$y = \frac{-3 \pm i\sqrt{7}}{4} = \frac{-3}{4} \pm \frac{i\sqrt{7}}{4}$$

$\textcircled{B}$



# AZCC1 Review Key Q2 T1

18)  $\frac{x^2-3x}{2x^2+x-6} \cdot \frac{x^2-4}{x^2-5x+6} = \frac{x(x-3)}{(x+2)(2x-3)} \cdot \frac{(x+2)(x-2)}{(x-3)(x-2)} = \boxed{\frac{x}{2x-3}}$

$ac = -12$   
 $b = 1$   
 $2x^2 + 4x - 3x - 6$   
 $2x(x+2) - 3(x+2)$   
 $(2x-3)(x+2)$

19)  $\frac{x^2-9}{x^2-5x} \cdot \frac{5x-x^2}{x^2-x-12} \cdot \frac{x^2-8x+16}{x-4} = \frac{(x+3)(x-3)}{x(x-5)} \cdot \frac{x(5-x)}{(x-4)(x+3)} \cdot \frac{(x-4)(x-4)}{x-4} = \boxed{-1(x-3)}$

20)  $3x^2-12$   
 $3(x^2-4)$   
 $\boxed{3(x+2)(x-2)}$

21)  $x^3-x^2-6x$   
 $x(x^2-x-6)$   
 $\boxed{x(x-3)(x+2)}$

22)  $4x^2-6x-4$   
 $2(2x^2-3x-2)$   
 $\frac{2x^2-4x+1x-2}{2x(x-2)+1(x-2)}$   
 $\boxed{2(x-2)(2x+1)}$

23)  $5a^2+14a-3$   
 $5a^2+15a-1a-3$   
 $5a(a+3)-1(a+3)$   
 $\boxed{(5a-1)(a+3)}$

24)  $a^3-2a^2+a-2$   
 $a^2(a-2)+1(a-2)$   
 $\boxed{(a-2)(a^2+1)}$

25)  $x^2+ax+bx+ab$   
 $x(x+a)+b(x+a)$   
 $\boxed{(x+a)(x+b)}$

26)  $\frac{5x^2-15x}{27x-3x^3} = \frac{5x(x-3)}{3x(9-x^2)} = \frac{5x(x-3)}{3x(3-x)(3+x)} = \boxed{\frac{-5}{3(3+x)}}$

27)  $\frac{x^2-7x-30}{x^2-5x-24} = \frac{(x-10)(x+3)}{(x-8)(x+3)} = \boxed{\frac{x-10}{x-8}}$

28)  $\frac{36x^3}{-42x^2} = \boxed{\frac{6x}{-7}}$

29)  $\frac{y^2+3y-28}{y^2-49} = \frac{(y+7)(y-4)}{(y+7)(y-7)} = \boxed{\frac{y-4}{y-7}}$

$$30) \frac{5}{3-x}$$

$$3-x \neq 0$$

$$\boxed{3} \neq x$$

$$31) \frac{10}{x^2-25}$$

$$x^2-25 \neq 0$$

$$(x+5)(x-5) \neq 0$$

$$x \neq -5 \quad x \neq 5$$

$$\boxed{5, -5}$$

$$32) \frac{x^2-49}{2x^2-3x}$$

$$2x^2-3x \neq 0$$

$$x(2x-3) \neq 0$$

$$x \neq 0 \quad 2x-3 \neq 0$$

$$2x \neq 3$$

$$x \neq \frac{3}{2}$$

$$\boxed{0, \frac{3}{2}}$$

$$33) \frac{x^2-x-2}{x^3+x^2-2x}$$

$$x^3+x^2-2x \neq 0$$

$$x^3+x^2-2x$$

$$x(x^2+x-2) \neq 0$$

$$x(x+2)(x-1) \neq 0$$

$$x \neq 0 \quad x \neq -2 \quad x \neq 1$$

$$\boxed{-2, 1, 0}$$

$$34) \frac{x - \sqrt{9-2x}}{-x} = 3$$

$$\frac{-\sqrt{9-2x}}{-1} = \frac{3-x}{-1}$$

$$\sqrt{9-2x} = -3+x$$

$$(\sqrt{9-2x})^2 = (x-3)^2$$

$$\begin{array}{rcl} 9-2x & = & x^2-6x+9 \\ -9+2x & & +2x-9 \end{array}$$

$$0 = x^2-4x$$

$$0 = x(x-4)$$

$$x=0$$

reject

$$\boxed{x=4}$$

$$35) \frac{\sqrt{2x+1}-1}{+1+1} = 4$$

$$(\sqrt{2x+1})^2 = (5)^2$$

$$2x+1 = 25$$

$$\begin{array}{rcl} -1 & -1 & \end{array}$$

$$2x = 24$$

$$\boxed{x=12}$$



$$36) \quad 2\sqrt{2x+3} + x = 1$$

$$-x \quad -x$$

$$(2\sqrt{2x+3})^2 = (1-x)^2$$

$$4(2x+3) = 1 - 2x + x^2$$

$$\begin{array}{r} 8x+12 \\ -8x-12 \\ \hline \end{array} = \begin{array}{r} x^2-2x+1 \\ -8x-12 \\ \hline \end{array}$$

$$0 = x^2 - 10x - 11$$

$$(x-11)(x+1)$$

$$\begin{array}{c|c} x=11 & x=-1 \\ \hline \text{reject} & \end{array}$$

$$37) \quad \sqrt{x-1} + x = 7$$

$$(\sqrt{x-1})^2 = (7-x)^2$$

$$\begin{array}{r} x-1 \\ -x+1 \\ \hline \end{array} = \begin{array}{r} 49-14x+x^2 \\ +1-x \\ \hline \end{array}$$

$$0 = 50 - 15x + x^2$$

$$= x^2 - 15x + 50$$

$$(x-10)(x-5)$$

$$\begin{array}{c|c} x=10 & x=5 \\ \hline \text{reject} & \end{array}$$



$b^2 - 4ac$

38)  $3x^2 - 10 = 5x$

$3x^2 - 5x - 10 = 0$

$(-5)^2 - 4(3)(-10)$

$25 + 120$

145

Real, Rational  
Unequal

39)  $x^2 - 10x + k = 0$

Imaginary when  $b^2 - 4ac < 0$

$(-10)^2 - 4(1)(k) < 0$

$100 - 4k < 0$

$\frac{100}{4} < \frac{4k}{4}$

$25 < k$

40)  $\frac{x^2 - 10x + 25}{x - 3} \leq 0$

$\frac{(x - 5)(x - 5)}{x - 3} \leq 0$

$x - 5 = 0$

$x = 5$

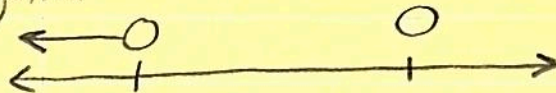
open

$x - 3 = 0$

$x = 3$

open

looking  
for  
negative



Test  
0

3

Test  
4

5

Test  
6

$\frac{0^2 - 10(0) + 25}{0 - 3}$

$\frac{25}{-3}$

negative  
✓

$\frac{4^2 - 10(4) + 25}{4 - 3}$

$\frac{1}{1}$

positive  
X

$\frac{6^2 - 10(6) + 25}{6 - 3}$

$\frac{1}{1}$

positive  
X

SB:  $\{x \mid x < 3\}$

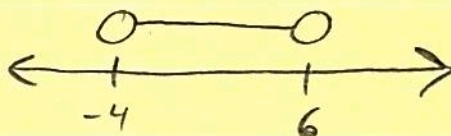
Int:  $(-\infty, 3)$

41)  $x^2 - 2x \leq 24$   
 $x^2 - 2x - 24 < 0$

$(x - 6)(x + 4)$

6 -4

GOLI  
open  
circles



SB:  $\{x \mid -4 < x < 6\}$

Int:  $(-4, 6)$

$$\begin{array}{r}
 x^3 - 7x^2 + 13x - 17 + \frac{21x+12}{x^2+2x+1} \\
 42) x^2+2x+1 \overline{) x^5 - 5x^4 + 0x^3 + 2x^2 + 0x - 5} \\
 \underline{-(x^5 + 2x^4 + x^3)} \downarrow \\
 -7x^4 - 1x^3 + 2x^2 \\
 \underline{-(-7x^4 - 14x^3 - 7x^2)} \downarrow \\
 13x^3 + 9x^2 + 0x \\
 \underline{-(13x^3 + 26x^2 + 13x)} \\
 -17x^2 - 13x - 5 \\
 \underline{-(-17x^2 - 34x - 17)} \\
 21x + 12 \text{ remainder}
 \end{array}$$

$$x^3 - 7x^2 + 13x - 17 + \frac{21x+12}{x^2+2x+1}$$

$$\begin{array}{r}
 2x^3 + 11x^2 + 44x + 175 + \frac{684}{x-4} \\
 43) x-4 \overline{) 2x^4 + 3x^3 + 0x^2 - x - 16} \\
 \underline{-(2x^4 - 8x^3)} \downarrow \\
 11x^3 + 0x^2 \\
 \underline{-(11x^3 - 44x^2)} \downarrow \\
 44x^2 - x \\
 \underline{-(44x^2 - 176x)} \downarrow \\
 175x - 16 \\
 \underline{-(175x - 700)} \\
 684
 \end{array}$$

$$2x^3 + 11x^2 + 44x + 175 + \frac{684}{x-4}$$